<u>Listing of the Claims:</u>

<u>Amendments to the Claims:</u>

This listing of claims will replace all prior versions, and listings, of claims in the application.

<u>Listing of Claims:</u>

1. (original) A method to adjust the data transfer rate for one of (N) primary backup appliances, wherein each of said (N) primary backup appliances is capable of communicating with one or more first data storage and retrieval systems and with one or more secondary backup appliance capable of communicating with one or more second data storage and retrieval systems, comprising the steps of:

providing a first one of said (N) primary backup appliances, wherein said first primary backup appliance is capable of communicating with a first one of said one or more secondary backup appliances;

forming by said first primary backup appliance at least one consistent transactions set comprising information received from said one or more first data storage and retrieval systems;

receiving the (n)th status signal from each of the other (N-1) primary backup appliances;

receiving the (n+1)th status signal from each of the other (N-1) primary backup appliances;

calculating the (n)th effective bandwidth for each of said (N) primary backup appliances;

calculating the (n)th time to complete for each of said (N) primary backup appliances;

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calculating the (n)th effective aggregate bandwidth for all (N) primary appliances;

determining if the (n)th time to complete for said first primary backup appliance is greater than the (n)th time to complete for each of the other (N-1) primary backup appliances;

operative if the (n)th time to complete for said first primary backup appliance is greater than the (n)th time to complete for each of the other (N-1) primary backup appliances, providing all or part of at least one consistent transactions set from said first primary backup appliance to said first secondary backup appliance with no delay.

2. (original) The method of claim 1, further comprising the steps of:

operative if the (n)th time to complete for said first primary backup appliance is not greater than the (n)th time to complete for each of the other (N-1) primary appliances, determining if the (n)th aggregate bandwidth is less than the (n-1) aggregate bandwidth;

operative if the (n)th aggregate bandwidth is not less than the (n-1) aggregate bandwidth, establishing the (n)th delay for said first primary backup appliance;

providing all or part of at least one consistent transactions set from said first primary backup appliance to said secondary backup appliance using said (n)th delay.

3. (original) The method of claim 2, further comprising the steps of:

operative if the (n)th aggregate bandwidth is less than the (n-1) aggregate bandwidth, determining if the (n-1)th delay for said first primary backup appliance is greater than the (n-2)th delay for said first primary backup appliance;

operative if the (n-1)th delay for said first primary backup appliance is greater than the (n-2)th delay for said first primary backup appliance, setting the (n)th delay for said first primary backup appliance equal to the (n-2)th delay for said first primary backup appliance;

providing all or part of at least one consistent transactions set from said first primary backup applianee to said secondary backup appliance using said (n)th delay.

4. (original) The method of claim 3, further comprising the steps of:

operative if the (n-1)th delay for said first primary backup appliance is not greater than the (n-2)th delay for said first primary backup appliance, establishing the (n)th delay for said first primary backup appliance;

providing all or part of at least one consistent transactions set from said first primary backup appliance to said seeondary backup appliance using said (n)th delay for said first primary backup appliance.

5. (original) The method of claim 2, wherein said establishing step further eomprises the steps of:

determining the (n)th mean time to complete for all (N) primary backup appliances;

determining if the (n)th time to complete for said first primary backup appliance substantially equals said (n)th mean time to complete;

operative if the (n)th time to complete for said first primary backup appliance substantially equals said (n)th mean time to complete, setting the (n)th delay for said first primary backup appliance equal to the (n-1)th delay for said first primary baekup appliance.

6. (original) The method of claim 5, wherein said establishing step further comprises the steps of:

providing a standard delay adjustment;

determining if the (n)th time to complete for said first primary backup appliance is greater than said (n)th mean time to complete;

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operative if the (n)th time to complete for said first primary backup appliance is greater than said (n)th mean time to complete, setting said (n)th delay for said first primary backup appliance equal to the (n-1)th delay for said first primary backup appliance minus said standard delay adjustment.

7. (original) The method of claim 6, further comprising the step of:

operative if said the (n)th time to complete for said first primary backup appliance is less than said (n)th mean time to complete, setting said (n)th delay for said first primary backup appliance equal to the (n-1)th delay for said first primary backup appliance plus said standard delay adjustment.

8. (original) The method of claim 5, wherein said establishing step further comprises the steps of

providing a delay adjustment function;

determining the difference between said (n)th mean time to complete and the (n)th time to complete for said first primary backup appliance;

establishing the (n)th delay for said first primary backup appliance based upon said difference and said delay adjustment function.

9. (original) The method of claim 5, wherein said establishing step further comprises the steps of:

providing a standard delay adjustment;

predicting the (n)th delay for each of said (N-1) remaining primary backup appliances using said (n)th mean time to complete, the (n)th time to complete for each of the (N-1) remaining primary backup appliances, and said standard delay adjustment;

establishing the (n)th delay for the first primary backup appliances based upon the predicted delays for each of said (N-1) remaining primary backup appliances.

10. (original) The method of claim 2, wherein said establishing step further comprises the steps of

providing a delay adjustment function;

predicting using said delay adjustment function (N-1) delay values, wherein each of said predicted delay values is associated with a different one of the remaining (N-1) primary backup appliances;

establishing the (n)th delay for the first primary backup appliances based upon said (N-1) predicted delay values.

11. (currently amended) An article of manufacture comprising a computer useable medium having computer readable program code disposed therein to adjust the data transfer rate for a first one of (N) primary backup appliances, wherein each of said (N) primary backup appliances is capable of communicating with one or more first data storage and retrieval systems and with one or more secondary backup appliances capable of communicating with one or more second data storage and retrieval systems, and wherein said article of manufacture is capable of communicating with a first one of said plurality of secondary backup appliances, the computer readable program code comprising a series of computer readable program steps to effect:

forming at least one consistent transactions set comprising information received from said one or more first data storage and retrieval systems;

receiving the (n)th status signal from each of the other (N-1) primary backup

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appliances;

receiving the (n+1)th status signal from each of the other (N-1) primary backup appliances;

calculating the (n)th effective bandwidth for eaeh of said (N) primary backup appliances;

calculating the (n)th time to complete for each of said (N) primary backup appliances;

calculating the (n)th effective aggregate bandwidth for all (N)primary appliances;

~~determining if the (n)th time to complete for said article of manufacture is greater than the (n)th time to complete for each of the other (N-1) primary backup appliances~~ determining if said article of manufacture has the greatest (n)th time to complete among the (N) primary backup appliances;

~~operative if the (n)th time to complete for said article of manufacture is greater than the (n)th time to complete for each of the other (N-1) primary backup appliances, providing all or part of at least one consistent transactions set to said first secondary backup appliance with no delay~~ operative if said article of manufacture has the greatest (n)th time to complete among the (N) primary backup appliances:

setting the (n)th delay to 0;

providing all or part of at least one consistent transactions set to said first secondary backup appliance using said (n)th delay.

12. (currently amended) The article of manufacture of claim 11, said computer readable program code further comprising a series of computer readable program steps to effect:

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operative if the (n)th time to complete for said article of manufacture is not greater than the (n)th time to complete for each of the other (N-1) primary appliances operative if said article of manufacture does not have the greatest (n)th time to complete among the (N) primary backup appliances, determining if the (n)th aggregate bandwidth is less than the (n-1) aggregate bandwidth;

operative if the (n)th aggregate bandwidth is not less than the (n-1) aggregate bandwidth, establishing the (n)th delay for said article of manufacture;

providing all or part of at least one consistent transactions set to said first secondary backup appliance using said (n)th delay.

13. (original) The article of manufacture of claim 12, said computer readable program code further comprising a series of computer readable program steps to effect:

operative if the (n)th aggregate bandwidth is less than the (n-1) aggregate bandwidth, determining if the (n-1)th delay for said article of manufacture is greater than the (n-2)th delay for said article of manufacture;

operative if the (n-1)th delay for said article of manufacture is greater than the (n-2)th delay for said first primary backup appliance, setting the (n)th delay for said article of manufacture equal to the (n-2)th delay for said article of manufacture;

providing all or part of at least one consistent transactions set to said first secondary backup appliance using said (n)th delay.

14. (original) The article of manufacture of claim 13, said computer readable program code further comprising a series of computer readable program steps to effect:

operative if the (n-1)th delay for said article of manufacture is not greater than the (n-

2)th delay for said article of manufacture, establishing the (n)th delay for said article of manufacture;

providing all or part of at least one consistent transactions set to said first secondary backup appliance using said (n)th delay.

15. (original) The article of manufacture of claim 12, said computer readable program code further comprising a series of computer readable program steps to effect:

determining the (n)th mean time to complete for all (N) primary backup appliances;

determining if the (n)th time to complete for said article of manufacture substantially equals said (n)th mean time to complete;

operative if the (n)th time to complete for said article of manufacture substantially equals said (n)th mean time to complete, setting the (n)th delay for said article of manufacture equal to the (n-1)th delay for said article of manufacture.

16. (original) The article of manufacture of claim 15, said computer readable program code further comprising a series of computer readable program steps to effect:

receiving a standard delay adjustment;

determining if the (n)th time to complete for said article of manufacture is greater than said (n)th mean time to complete;

operative if said the (n)th time to complete for said article of manufacture is greater than said (n)th mean time to complete, setting said (n)th delay for said article of manufacture equal to the (n-1)th delay for said article of manufacture minus said standard delay adjustment.

17. (original) The article of manufacture of claim 16, said computer readable program code further comprising a series of computer readable program steps to effect:

operative if said the (n)th time to complete for said article of manufacture is less than said (n)th mean time to complete, setting said (n)th delay for said article of manufacture equal to the (n-1)th delay for said article of manufacture plus said standard delay adjustment.

18. (original) The article of manufacture of claim 15, said computer readable program code further comprising a series of computer readable program steps to effect:

receiving a delay adjustment function;

determining the difference between said (n)th mean time to complete and the (n)th time to complete for said article of manufacture;

establishing the (n)th delay for said article of manufacture based upon said difference and said delay adjustment function.

19. (original) The article of manufacture of claim 15, said computer readable program code further comprising a series of computer readable program steps to effect::

receiving a standard delay adjustment;

predieting the (n)th delay for each of said (N-1) remaining primary backup appliances using said (n)th mean time to complete, the (n)th time to complete for each of the (N-1) remaining primary backup appliances, and said standard delay adjustment;

establishing the (n)th delay for the article of manufacture based upon the predicted delays for each of said (N-1) remaining primary backup appliances.

20. (original) The article of manufacture of claim 12, said computer readable program eode further comprising a series of computer readable program steps to effect:

receiving a delay adjustment function;

predicting using said delay adjustment function (N-1) delay values, wherein each of

said predicted delay values is associated with a different one of the remaining (N-1) primary backup appliances;

establishing the (n)th delay for said article of manufaeture based upon said (N-1) predicted delay values.

21. (currently amended) A computer program product <u>embodied in a computer readable medium</u> usable with a <s>usable with a</s>-programmable computer processor having computer readable program code embodied therein to adjust the data transfer rate for a first one of (N) primary backup appliances, wherein each of said (N) primary backup appliances is capable of communicating with one or more first data storage and retrieval systems and with one or more secondary backup appliances capable of communicating with one or more second data storage and retrieval systems, and wherein said first primary backup applianee is capable of communicating with a first one of said plurality of secondary backup appliances, comprising:

computer readable program code which causes said programmable eomputer processor to form at least one consistent transactions set comprising information received from said one or more first data storage and retrieval systems;

computer readable program code which causes said programmable computer proeessor to reeeive the (n)th status signal from each of the other (N-1) primary baekup appliances;

computer readable program code which causes said programmable computer processor to receive the (n+1)th status signal from each of the other (N-1) primary backup appliances;

computer readable program code which causes said programmable computer processor to calculate the (n)th effective bandwidth for each of said (N) primary backup appliances;

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computer readable program code which causes said programmable computer processor to calculate the (n)th time to complete for each of said (N) primary backup appliances;

computer readable program code which causes said programmable computer processor to calculate the (n)th effective aggregate bandwidth for all (N)primary appliances;

computer readable program code which causes said programmable computer processor to determine if the (n)th time to complete for said first primary backup appliance is greater than the (n)th time to complete for each of the other (N-1) primary backup appliances;

computer readable program code which, if the (n)th time to complete for said first primary backup appliance is greater than the (n)th time to complete for each of the other (N-1) primary backup appliances, causes said programmable computer processor to provide all or part of at least one consistent transactions set to said first secondary backup appliance with no delay.

22. (original) The computer program product of claim 21, further comprising:

computer readable program code which, if the (n)th time to complete for said first primary backup appliance is not greater than the (n)th time to complete for each of the other (N-1) primary appliances, causes said programmable computer processor to determine if the (n)th aggregate bandwidth is less than the (n-1) aggregate bandwidth;

computer readable program code which, if the (n)th aggregate bandwidth is not less than the (n-1) aggregate bandwidth, causes said programmable computer processor to establish the (n)th delay for said first primary backup appliance;

computer readable program code which causes said programmable computer processor to provide all or part of at least one consistent transactions set to said secondary backup

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appliance using said (n)th delay.

23. (original) The computer program product of claim 22, further comprising:

computer readable program code which, if the (n)th aggregate bandwidth is less than the (n-1) aggregate bandwidth, causes said programmable computer processor to determine if the (n-1)th delay for said first primary backup appliance is greater than the (n-2)th delay for said first primary backup applianee;

computer readable program code which, if the (n-1)th delay for said first primary backup appliance is greater than the (n-2)th delay for said first primary backup appliance, causes said programmable computer processor to set the (n)th delay for said first primary backup appliance equal to the (n-2)th delay for said first primary backup appliance;

computer readable program code which causes said programmable computer processor to provide all or part of at least one consistent transactions set to said secondary backup appliance using said (n)th delay.

24. (original) The computer program product of claim 23, further comprising:

computer readable program code which, if the (n-1)th delay for said first primary backup appliance is not greater than the (n-2)th delay for said first primary backup appliance, causes said programmable computer processor to establish the (n)th delay for said first primary backup appliance;

computer readable program code which causes said programmable computer processor to provide all or part of at least one consistent transactions set to said first secondary backup appliance using said (n)th delay for said first primary backup appliance.

25. (original) The computer program product of claim 22, further comprising:

computer readable program code which causes said programmable computer processor to determine the (n)th mean time to complete for all (N) primary backup appliances;

computer readable program code which causes said programmable computer proeessor to determine if the (n)th time to complete for said first primary backup applianee substantially equals said (n)th mean time to eomplete;

computer readable program eode which, if the (n)th time to complete for said first primary backup appliance substantially equals said (n)th mean time to complete, causes said programmable computer processor to set the (n)th delay for said first primary backup appliance equal to the (n-1)th delay for said first primary backup appliance.

26. (original) The computer program product of claim 25, further comprising:

computer readable program code which causes said programmable computer processor to receive a standard delay adjustment;

computer readable program code which causes said programmable computer processor to determine if the (n)th time to complete for said first primary backup appliance is greater than said (n)th mean time to complete;

computer readable program code which, if said the (n)th time to complete for said first primary backup appliance is greater than said (n)th mean time to complete, causes said programmable computer processor to set said (n)th delay for said first primary backup appliance equal to the (n-1)th delay for said first primary backup appliance minus said standard delay adjustment.

27. (original) The computer program produet of claim 26, further comprising computer readable program code which, if said the (n)th time to complete for said first primary backup

appliance is less than said (n)th mean time to complete, causes said programmable computer processor to set said (n)th delay for said first primary backup appliance equal to the (n-1)th delay for said first primary backup appliance plus said standard delay adjustment.

28. (original) The computer program product of claim 25, further comprising:

computer readable program code which causes said programmable computer processor to receive a delay adjustment function;

computer readable program code which causes said programmable computer processor to determine the difference between said (n)th mean time to complete and the (n)th time to complete for said first primary backup appliance;

computer readable program code which causes said programmable computer processor to establish the (n)th delay for said first primary backup appliance based upon said difference and said delay adjustment function.

29. (original) The computer program product of claim 25, further comprising:

computer readable program code which causes said programmable computer processor to receive a standard delay adjustment;

computer readable program code which causes said programmable computer processor to predict the (n)th delay for eaeh of said (N-1) remaining primary backup appliances using said (n)th mean time to eomplete, the (n)th time to complete for each of the (N-1) remaining primary backup appliances, and said standard delay adjustment;

computer readable program code which causes said programmable computer processor to establish the (n)th delay for the first primary backup appliances based upon the predicted delays for each of said (N-1) remaining primary backup appliances.

30. (original) The computer program product of claim 22, further comprising:

computer readable program code which causes said programmable computer processor to receive a delay adjustment function;

computer readable program code which causes said programmable computer processor to predict using said delay adjustment function (N-1) delay values, wherein each of said predicted delay values is associated with a different one of the remaining (N-1) primary backup appliances;

computer readable program code which causes said programmable computer processor to establish the (n)th delay for the first primary backup appliances based upon said (N-1) predicted delay values.